

SERIES HSD37

NorthStar™ brand

Harsh Duty Optical Encoder

Key Features

- Unbreakable Code Disc up to 5000PPR
- Dual Isolated Outputs Available for Redundancy
- Anodized Aluminum, Stainless Steel, or Nickel Plated Housing
- IP67 Sealing



SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Code: Incremental

Resolution: to 5000 PPR (pulses/revolution) See Ordering Information

Format: Two channel quadrature (AB) with optional Index (Z), and complementary outputs

Phase Sense: A leads B for CCW shaft rotation viewing the shaft clamp end of the encoder

Quadrature Phasing: For resolutions to 1200 PPR: $90^\circ \pm 15^\circ$ electrical; For resolutions over 1250 PPR: $90^\circ \pm 30^\circ$ electrical

Symmetry:
For resolutions to 1024PPR: $180^\circ \pm 18^\circ$ electrical
For resolutions over 1024PPR: $180^\circ \pm 25^\circ$ electrical

Waveforms: Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf

ELECTRICAL

Input Power: 7-26VDC. 50 mA max., not including output loads.

Frequency Response: 125 kHz (data & index)

Termination: MS Connector; M12 Connector; cable exit w/seal. See Ordering Information

Mating Connector:

6 pin MS, style MS3106A-14S-6S (MCN-N4)

7 pin MS, style MS3106A-16S-1S (MCN-N5)

10 pin MS, style MS3106A-18-1S (MCN-N6)

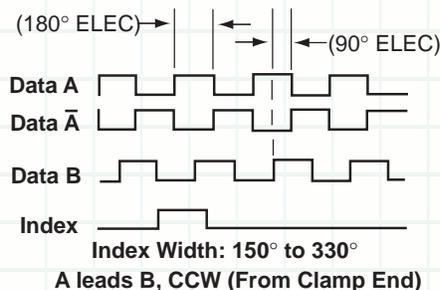
10 pin Bayonet, MS3116-F12-10S (MCN-B1)

10 pin, NEMA 4 style (MCN-N6N4)

Cable w/ 5 pin M12 connector, p/n 112859-xxx

Cable w/ 8 pin M12 connector, p/n 112860-xxx

DATA AND INDEX Not all complements shown A shown for reference



MECHANICAL

Shaft Material: Stainless Steel (Anodized 6061 aluminum for 1" isolated bore option)

Bore Diameter: 1.00", 0.875", 0.750", 0.625", 0.500", 16mm, 15mm, 12mm. Insulated inserts provided for bores under 1 inch (1" bore not electrically isolated for stainless shaft option)

Bore runout: ± 0.0005 TIR at midpoint

Min. Shaft Engagement: 1.60" (Recommended)

Starting torque: 4.5 in-oz. maximum (at 25°C)

Running torque: 4.0 in-oz. maximum (at ambient)

Bearings: 61806-ZZ

Bearing life: 5×10^8 revs at rated shaft Loading,
 5×10^{11} revs at 10% of rated shaft loading.
(manufacturers' specs)

Housing and cover: Hard Anodized Aluminum.
Also available in Stainless Steel.

Disc material: Plastic

Weight: 35 ounces, typical

ENVIRONMENTAL

Operating Temperature: -40 to 100°C

Storage temperature: -40 to 100°C

Shock: 400g for 6msec duration

Vibration: 5 to 3000Hz @ 20g

Humidity: 100%

Enclosure Rating: IP67

Note: "MS" type mating connectors and prebuilt cables are rated NEMA 12. "M12" Cable assemblies are rated IP67

Ordering Information

To order, complete the model number with code numbers from the table below:

Code 1: Model	Code 2: PPR	Code 3: Shaft	Code 4: Output Format	Code 5: Termination	Code 6: Options	Code 7: Special Option
HSD37	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>				

Ordering Information						
HSD37 Heavy Duty Hollowshaft Encoder	0015 0032 0050 0060 0100 0200 0240 0250 0500 0512 0600 1000 1024 1200 2000 2048 3072 5000	0 6mm 1 1/4" 2 5/16" 3 8mm 4 3/8" 5 10mm 6 12mm 7 1/2" 8 5/8" 9 15mm A 16mm C 19mm D 3/4" E 20mm F 7/8" G 24mm H 1" Non Isolated P 25mm Non Isolated R 1" Isolated	0 Single Ended ABZ, 7-26VDC push-pull 1 Single Ended ABZ, 7-26VDC open collector (7273) 2 Single Ended ABZ, 7-26VDC open collector (2222) 3 Single Ended ABZ, 7-26VDC open collector w/1k0hm (2222) <i>Options 4 & 5 not available when Code 5 is H</i> 4 Differential AB only, 7-26, 7-26 out (7272) 5 Differential AB only, 7-26 in, 5V out (7272) <i>Options 6 & 7 not available when Code 5 is 0, 1, 5, 6, H</i> 6 Differential ABZ, 7-26 in, 5V out (7272) 7 Differential ABZ, 7-26 in, 7-26 out (7272)	0 6 pin connector 1 7 pin connector 2 10 pin connector 4 10 pin Bayonet connector 5 6 pin+mating connector 6 7 pin+mating connector 7 10 pin+mating connector 8 12 CW pin+mating connector 9 10 pin Bayonet+mating connector A .5m (20") cable C 1m (39") cable D 2m (79") cable H 5 pin M12 connector J 8 pin M12 connector K 1.5 ft (18") cable w/ in line 10pin connector M 5 ft (60") cable N 10 ft (120") cable P 1.5 ft (18") Cable with 10-pin Bulkhead Connector <i>available when Code 6 is 0, 1, 2, 3, A, C</i> T Terminal box w/conduit entry	0 No options 1 Slotted Tether 2 Single point 4.5" C-face tether 3 Single point 8.5" C-face tether 4 Dual Isolated Outputs, No tether 5 Dual Isolated Outputs, Slotted Tether 6 Dual Isolated Outputs, 4.5" C-face tether 7 Dual Isolated Outputs, 8.5" C-face tether A Swivel Rod tether C Metric Swivel Rod tether D Dual Isolated Outputs, Swivel Rod Tether E Dual Isolated Outputs, Metric Swivel Rod Tether	Blank None 01 Nickel Plated 02 Stainless Steel

Accessories

- 114573-0001** Tether Kit, 4.5" C-face single point with 3/8" bolt
- 114574-0001** Tether Kit for Standard AC motor fan covers with T-bolt
- 114575-0001** Tether Kit, 8.5" C-face single point with 1/2" bolt

The following Cover Kits are not compatible when Code 5 is T

- 114591-0001** Cover Kit, 56C face
- 114592-0001** Cover Kit, fan cover
- 114593-0001** Dual Cover Kit, 56C face
- 114594-0001** Dual Cover Kit, fan cover

10 foot Cable Assemblies with MS Connector

- 108594-0010** 6 Pin MS, Cable Assy. For Use with Single Ended Outputs
- 108595-0010** 7 Pin MS, Cable Assy. For Use with Single Ended Outputs
- 108596-0010** 7 Pin MS, Cable Assy. For Use with Differential Line Driver w/o Index Outputs
- 1400635-0010** 10 Pin MS, Cable Assy. For Use with Differential Line Driver with Index Outputs
- 109209-0010** NEMA4 10 pin MS, Cable Assy. For use with differential line driver with index outputs

15 foot Cable Assemblies with M12 Connector

- 112859-0015** 5 Pin M12, Cable Assy. For Use with Single Ended Outputs

- 112860-0015** 8 Pin M12, Cable Assy. For Use with Single Ended Outputs

- 112860-0015** 8 Pin M12, Cable Assy. For Use with Differential Line Driver Outputs

Mating Connectors (no cable)

- 6 pin, style MS3106A-14S-6S (MCN-N4);
- 7 pin, style MS3106A-16S-1S (MCN-N5);
- 10 pin, style MS3106A-18-1S (MCN-N6)
- 10 pin bayonet, style MS3116-F12-10S (MCN-B1)
- 10 pin, NEMA 4 style (MCN-N6N4)

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ELECTRICAL CONNECTIONS

6, 7 & 10 Pin MS Connectors and Cables

Connector & mate/accessory cable assembly pin numbers and wire color information is provided here for reference. HSD37 models with direct cable exit carry the color coding as shown in the right hand column.

Encoder Function	Cable # 108594-6 Pin Single Ended		Cable # 108595-7 Pin Single Ended		Cable # 108596-7 Pin Dif Line Driver with Index		Cable # 1400635- or 109209- (NEMA4) 10 Pin Dif Line Drv w/Idx		Cable # 114448-* 10 Pin Bayonet		Cable Exit with Seal
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	
Sig. A	E	BRN	A	BRN	A	BRN	A	BRN	A	BRN	GRN
Sig. B	D	ORN	B	ORG	B	ORG	B	ORG	B	ORG	BLU
Sig. Z	C	YEL	C	YEL	—	—	C	YEL	C	YEL	ORG
Power +V	B	RED	D	RED	D	RED	D	RED	D	RED	RED
Com	A	BLK	F	BLK	F	BLK	F	BLK	E	—	BLK
Case	—	—	G	GRN	G	GRN	G	GRN	F	BLK	WHT
N/C-Shield	F	—	E	—	—	—	E	—	G	GRN	—
Sig. \bar{A}	—	—	—	—	C	BRN/WHT	H	BRN/WHT	H	BRN/WHT	VIO
Sig. \bar{B}	—	—	—	—	E	ORG/WHT	I	ORG/WHT	J	ORG/WHT	BRN
Sig. \bar{Z}	—	—	—	—	—	—	J	YEL/WHT	K	YEL/WHT	YEL

For watertight applications, use NEMA4 10 pin cable & connector 109209-XXXX.

5 & 8 Pin M12 Accessory Cables when Code 5= H or J

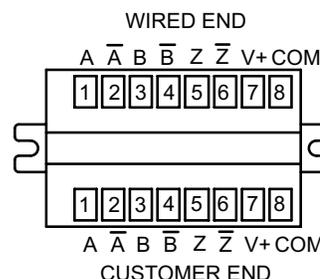
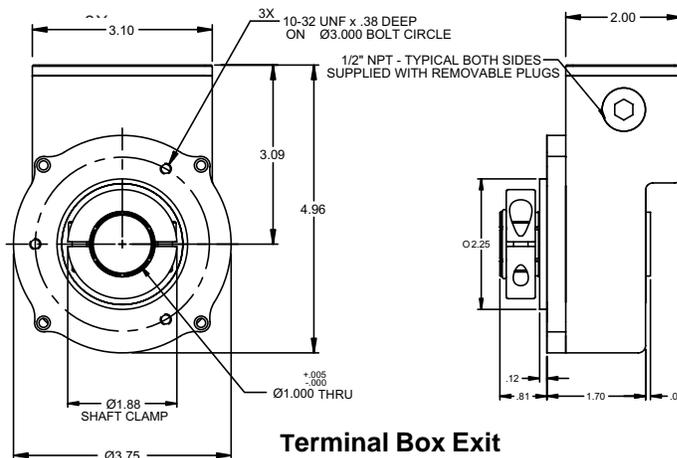
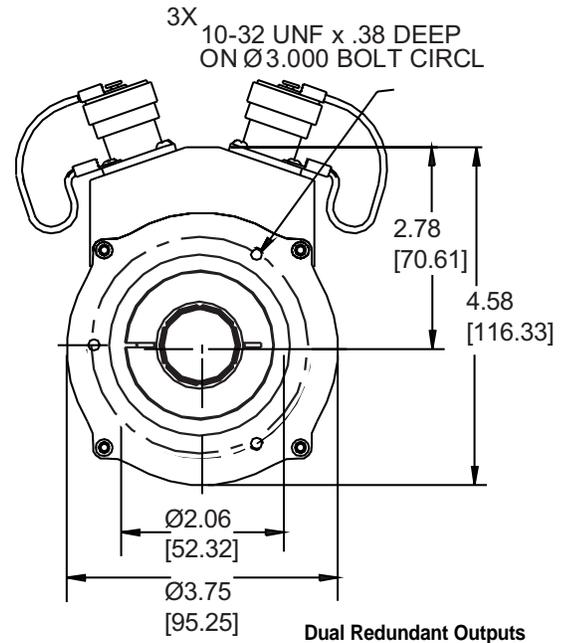
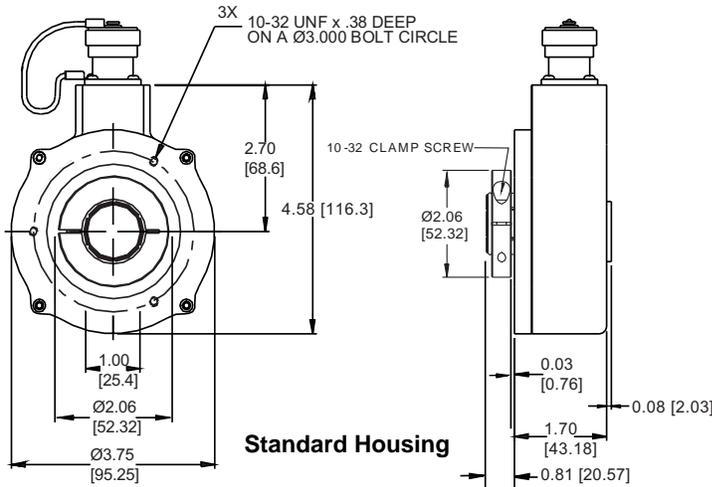
Connector pin numbers and cable assembly wire color information is provided here for reference.

Encoder Function	Cable # 112859-5 Pin Single Ended		Cable # 112860-8 Pin Single Ended		Cable # 112860-8 Pin Differential	
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color
Sig. A	4	BLK	1	BRN	1	BRN
Sig. B	2	WHT	4	ORG	4	ORG
*Sig. Z	5	GRY	6	YEL	6	YEL
Power +V	1	BRN	2	RED	2	RED
Com	3	BLU	7	BLK	7	BLK
Sig. \bar{A}	—	—	—	—	3	BRN/WHT
Sig. \bar{B}	—	—	—	—	5	ORG/WHT
*Sig. \bar{Z}	—	—	—	—	8	YEL/WHT

* Index not provided on all models. See ordering information

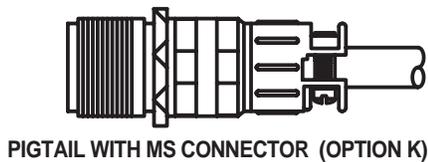
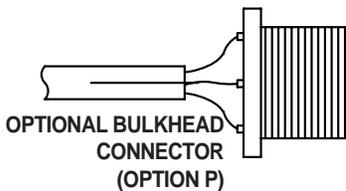
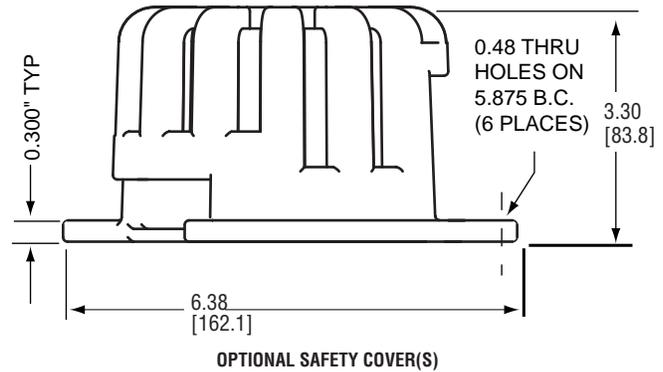
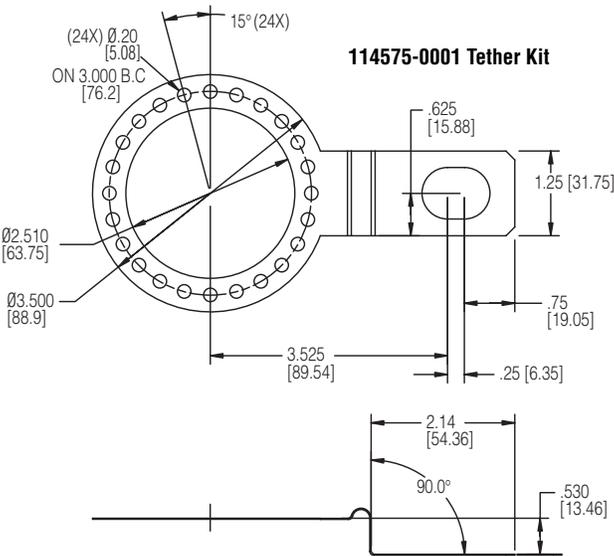
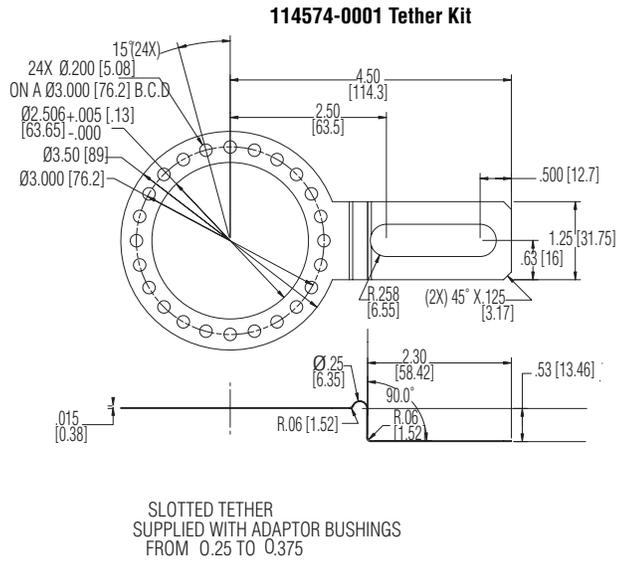
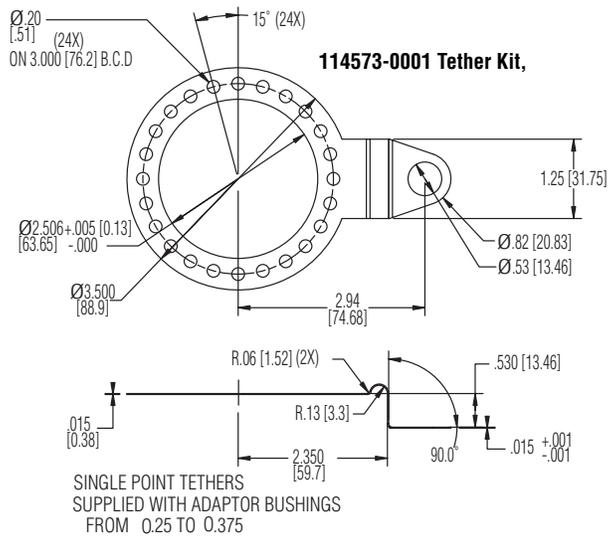
Cable Configuration: PVC jacket, 105 °C rated, overall foil shield; 24 AWG conductors, minimum

DIMENSIONS (inches [mm])



- A - GREEN
- A - VIOLET
- B - BLUE
- B - BROWN
- Z - ORANGE
- Z - YELLOW
- V+ - RED
- COM - BLACK

DIMENSIONS (inches [mm])



Worldwide Brands: NorthStar™ • Acuro™ • Dynapar™ • Hengstler™ • Harowe™

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